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ROYAL

BLUE BOOK

TEST

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Subject. Chemistry

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MADE EXPRESSLY FOR

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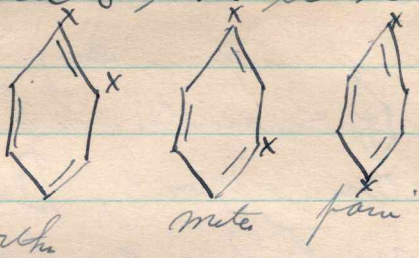
Books and Stationery

Holland, Mich.

I. If benzene was an ordinary aliphatic compound it would combine with more than six hydrogen atoms and if saturated it would form C_6H_{14} instead of C_6H_6 or $C_6H_6Br_6$.

The structure as assigned to benzene is concluded from the fact that it forms but one monosubstitution product as when it is heated with Br + the C_6H_5Br comp is formed. Further but three disubstitution products can be formed - the meta, the para & the ortho comps.



The fact that it can form C_6H_{12} leads us to suppose that the alternate carbon atoms in the ring are united by a double bond & that when the extra H atoms are added these bond units each then

Benzene is a saturated comp
for the reason that it does
not react to form addition
products when treated with
potassium permanganate.

One objection to Kekule
structure of benzene is
that it does not account
for the third double valence.
According to Kekule's
structure two mono-substitution
products should be formed. Kekule
explained this by saying that
the double valence shifted.

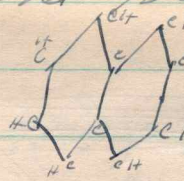
Other structures are that of
Claus ⬡ - double valence joined
to the one opposite; Bayer ⬡
valence neutralize each other;
Thiele - Conjugated bonds.

Naphthalene.

It has structure $C_{10}H_8$.
The fact that when it is oxidized
phthalic acid is formed shows

that it has a benzene ring with side chains in the ortho position . If nitro-naphth

phthalic acid.

is oxidized we have a nitrophthalic acid formed. If the NO_2 group is reduced to an amine group and then the compound is oxidized we have phthalic acid formed & the benzene side chain with the amine gp is broken up. This is according to the nature of an amine gp.
Thus shown that Naphthalene has the structure represented by the


~~that it has~~

II T

(a) (1) Fitting synthesis

$C_6H_5Cl + CH_3Br + 2Na = C_6H_5CH_3 +$
$NaCl + NaBr.$

(2) Friedal + Craft syn.

$C_6H_6 + CH_3I + alcl_3 = C_6H_5CH_3 + HCl.$

(3) Grignards syn.

$C_6H_5MgBr + CH_3I = C_6H_5CH_3 + MgBrI.$

(b) Amines

Primary amine, $C_6H_5NO_2 + 6H = C_6H_5NH_2 + 2H_2O$

2nd ~~$C_6H_5OH + C_6H_5NH_2 = (C_6H_5)_2NH$~~

$C_6H_5OH + ZnCl_2 + C_6H_5NH_2 = (C_6H_5)_2NH.$
$+ ZnCl_2 + H_2O$

3er amines

$2C_6H_5Br + C_6H_5NK_2 = (C_6H_5)_3N + 2KBr_2$

(c) Phenol

~~$C_6H_5NH_3Cl$~~

$C_6H_5N_2Cl + H_2O = C_6H_5OH + N_2 + HCl$

(d). Ketones ~~C~~

~~$C_6H_5 - COOH + NH_3$~~

$CH_3COCl + C_6H_6 \xrightarrow{AlCl_3} CH_3COC_6H_5 + HCl$

(e) Quinones - by ox of derivatives of Benzen.

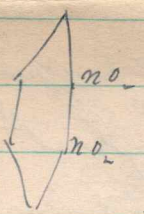
III Influence of radical on position. There are three positions possible for disubstitution products, the ortho, the meta + the para. The position taken by an entering group is determined by the group present, the group entering the temp. + the catalyst.

The different radicals are classed as ortho + para directing or meta directing. When the ring contains an OH, NH_2, Cl, Br, I CH_3, etc. the entering group usually takes the ortho or para position. If it contains an NO_2 or $COOH$, CHO or HSO_3 the entering comp takes the meta position. The difference in these groups or the reason

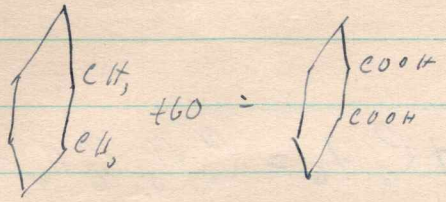
why the direct group is not known just when the meta directing group are united with the OH yp they all form acids - further the all are in a state of unsaturation.

IV How Meta tol. $CH_3 C_6H_4 NH_2$

$C_6H_6 + HNO_3 = C_6H_4(NO_2)_2$ Meta position



~~C_6H_6~~



~~IV~~ Prep. of diaz. com.

$$C_6H_5NO_2 + 7HCl + 3Fe_2 = C_6H_5NH_2Cl + 3FeCl_4 + 2H_2O$$

$$C_6H_5NH_2HCl + HNO_2 = C_6H_5N_2Cl + 2H_2O$$

Called diazonium com. because it contain two azote = N atoms.

Five reactions

$$C_6H_5N_2Cl + H_2O = C_6H_5OH + N_2 + HCl$$

$$C_6H_5N_2Cl + KCN = C_6H_5CN + N_2 + KCl$$

$C_6H_5N_2SO_4H + \overset{HI}{\cancel{CH_3I}} = C_6H_5I + N_2 + H_2SO_4$

$C_6H_5N_2Cl + C_6H_6 = C_6H_5C_6H_5 + HCl$

$C_6H_5N_2Cl + CH_3OH = C_6H_4OHCH_3 + N_2 + HCl$

Iplodge that a Smith gavor got aid in this Lot. Jon JN Dyspsom